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ON AUXILYSINS.*†

A PRELIMINARY COMMUNICATION.

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MUCH light has been thrown on the nature of the immune substances in serum and body fluids by the discovery of simple chemical compounds capable of inhibiting or neutralizing these substances.[1] Although the study of these elementary antihemolysins, antibacteriolysins, and the like, may eventually lead to practical results, their direct application in medicine seems remote. If, however, substances of the opposite nature can be found, substances capable of increasing or augmenting the action of such serum and body fluids, their immediate application in surgery, obstetrics, and internal medicine may be predicted.

During the course of experiments undertaken for an entirely different purpose, a substance of this nature has been discovered. This substance is capable of producing a marked increase in the hemolytic and hemagglutinating action of hemolytic serum.

The action of this auxihemolysin‡ and auxihemagglutinin (αὔξειν, to increase) is still under investigation, and will be reported in full later. A few facts, however, sufficient to call attention to the existence of auxilysins, will be given here, in the hope of stimulating search for members of this group of therapeutic value. An auxibacteriolysin or an auxopsonin would promise much in practical medicine.

If normal goat serum is heated to 56° C. for 30 minutes, it loses completely its power to reactivate a hemolytic goat serum that has been rendered inactive by heat. The complement originally present in the normal serum is completely destroyed by such heating. The normal serum, however, is still capable of exerting a considerable influence on lytic action, as will be shown in detail in a later paper.

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[1] *Jour. Infect. Dis.*, 1904, 1, p. 112.

‡ For suggestion as to the use of the prefix *auxi-*, I am indebted to Professor H. A. Hoffman, Department of Greek, Indiana University.

If, however, the heating is continued for three or four hours, the serum undergoes still further changes and acquires the new property of being able enormously to increase the action of the hemolytic serum to which it is added. On prolonging the heating beyond a certain maximum, this auxilytic power is decreased.

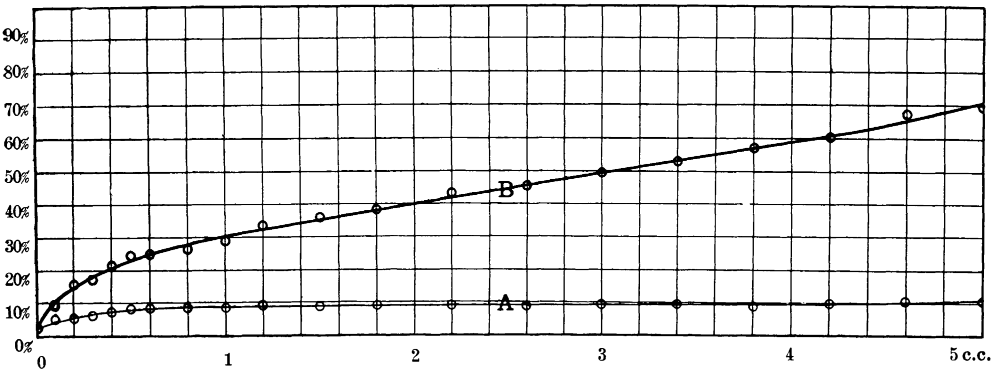

FIG. 1.—Auxilytic Curve. *A* = Curve showing changes in hemolytic power as increasing amounts of normal serum, heated to 56° C. for 45 minutes are added to a constant amount of hemolytic serum. *B* = Curve showing the auxilytic action of the same serum, when heated to 56° C. for 4 hours. The hemolytic serum of this experiment, which in itself is capable of giving but 3 per cent hemolysis, has its power increased to 70 per cent by the auxilysin. The auxilysin in itself produces no hemolysis, is incapable of reactivating heated hemolytic serum, and gives no hemolytic power to normal serum.

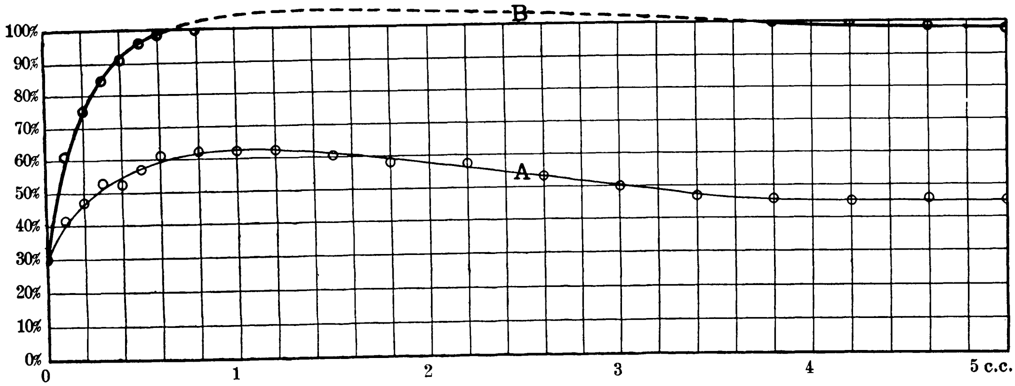

FIG. 2.—Auxilytic Curve. *A* = Curve as in Fig. 1, obtained with normal serum, heated to 56° C. for 45 minutes. *B* = Curve showing the auxilytic action of the same serum, when heated to 56° C. for 3½ hours.

The action of this auxilytic substance is shown graphically in Fig. 1.[1] This represents the increase in hemolytic power caused by the addition of increasing amounts of the auxilysin to a constant amount of hemolytic serum. Similar curves are shown in Figs. 2 and 3. In Fig. 3, in place of the constant amount of hemolytic serum, a constant amount of an artificial hemolytic amboceptor-complement mixture was used.

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[1] For technique see *Jour. Infect. Dis.*, 1905, 2, p. 460.

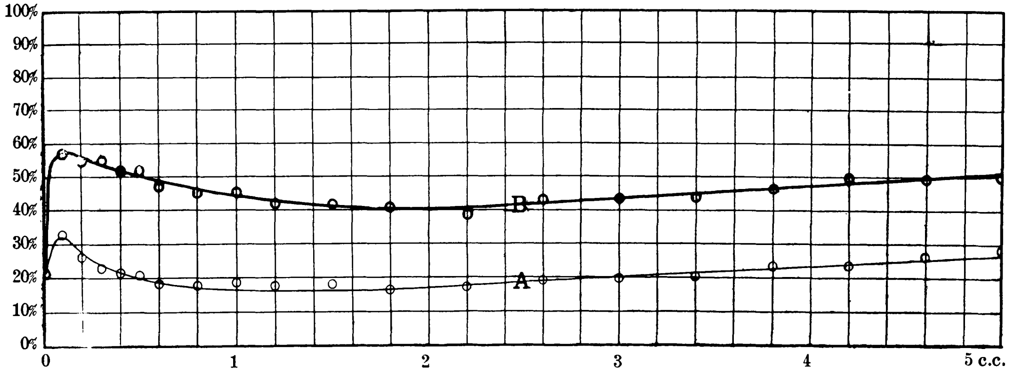

FIG. 3.—Auxilytic Curve. *A* = Curve as in Figs. 1 and 2, obtained with normal serum, heated to 56° C. for 45 minutes. *B* = Curve showing the auxilytic action of same serum, when heated to 56° C. for 4 hours. This experiment differs from those of Figs. 1 and 2, in that, in place of a constant amount of hemolytic serum, a constant amount of artificial hemolytic amboceptor-complement mixture was used.

The immune serum used in this work, possesses not only hemolytic, but hemagglutinating properties as well. This hemagglutinating power is preserved after the destruction of the hemolytic properties by heat. Although accurate measurements have not yet been made, rough determinations show that the auxilytic serum possesses marked auxagglutinating properties as well; the heated hemolytic serum to which it is added being capable of agglutinating corpuscles much more rapidly and completely than normally. Accurate measurements of this auxagglutinin will be made later.

SUMMARY.

Normal goat serum, heated to 56° C. for three or four hours, acquires marked auxilytic and auxagglutinating properties, when tested with goat serum immunized against sheep corpuscles.